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IDAHO PUBLIC  
UTILITIES COMMISSION

BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION )  
OF IDAHO POWER COMPANY FOR A )  
CERTIFICATE OF PUBLIC CONVENIENCE )  
AND NECESSITY FOR THE COLUMBIA )  
SUBSTATION, THE COLUMBIA TO KUNA ) CASE NO. IPC-E-09-26  
138 KV TRANSMISSION LINE, )  
RECONSTRUCTION OF THE CALDWELL TO )  
HUBBARD 230 KV TRANSMISSION LINE, )  
AND RELATED TRANSMISSION AND )  
DISTRIBUTION FACILITIES )  
\_\_\_\_\_ )

IDAHO POWER COMPANY

DIRECT TESTIMONY

OF

DAVID M. ANGELL

1 Q. Please state your name, business address,  
2 and present occupation.

3 A. My name is David Angell and my business  
4 address is 1221 West Idaho Street, Boise, Idaho. I am  
5 employed by Idaho Power Company ("Idaho Power" or  
6 "Company") as the Manager of Delivery Planning.

7 Q. What is your educational background?

8 A. I graduated in 1984 and 1986 from the  
9 University of Idaho, Moscow, Idaho, receiving a Bachelor of  
10 Science Degree and Master of Engineering Degree in  
11 Electrical Engineering, respectively. I have provided  
12 electrical engineering instruction for both the University  
13 of Idaho and Boise State University. Most recently I  
14 instructed power system analysis at Boise State University  
15 during the 2009 spring semester.

16 Q. Please outline your business experience with  
17 Idaho Power.

18 A. From 1986 to 1996, I was employed by Idaho  
19 Power as an engineer in both communications and protection  
20 systems. In 1996, I became the Engineering Leader of  
21 System Protection and Communications. I held this position  
22 until 2004, when I transferred to Transmission and  
23 Distribution Planning. During the fall of 2006, I accepted  
24 the positions of System Planning Leader and Manager of

1 Delivery Planning. I have been managing Idaho Power's load  
2 research, interconnected-transmission system, sub-  
3 transmission, and distribution planning since 2006.

4 Q. Can you describe Idaho Power's process for  
5 planning facilities to provide electric service to  
6 communities?

7 A. Yes. Planning engineers begin by  
8 establishing the "build-out" electrical load for a  
9 community. Our planning engineers apply electrical load  
10 densities based on the zoning plan included in the  
11 community's comprehensive plan. The load of each zone is  
12 aggregated to determine the community's build-out load.  
13 Substation service zones are identified based on a maximum  
14 of eight 12.5 kilovolt ("kV") feeders and four 34.5 kV  
15 feeders per substation. This allows a typical substation to  
16 service up to 80 megawatts ("MW").

17 The substation service zones are arranged for  
18 complete coverage of the electrical load and for the  
19 ability to provide load service to adjacent substation  
20 service areas. Idaho Power arranges the load service area  
21 in diamond shaped service zones. The engineers then arrange  
22 distribution circuits within each service zone. This  
23 results in a grid of substations with distribution circuits  
24 that serve a particular zone and have normally open

1 connections to adjacent zone distribution circuits for  
2 reliable service during circuit outages. This planning  
3 technique is consistent with those described in *Power*  
4 *Distribution Planning Reference Book*, Second Edition, by H.  
5 Lee Willis, 2004, Marcel Dekker, Inc, New York.

6           Once the long term plan is established, engineers  
7 determine when and how to construct the system by  
8 monitoring load development. The distribution circuit peak  
9 winter and summer electrical demands are tracked in a  
10 database. Additionally, the engineers monitor the  
11 residential and commercial development and occupancy rates  
12 to forecast the five year distribution circuit load.  
13 Finally, projects are initiated years in advance of the  
14 need to allow time to acquire permits and construct the  
15 facilities.

16           Q.       Has there been community involvement in  
17 siting electric facilities?

18           A.       In 2005, Idaho Power began the first  
19 community advisory committee to determine the long term,  
20 build out of electric facilities in the Treasure Valley.  
21 The committee was made up of elected officials,  
22 jurisdictional planners, civic leaders, private  
23 business/developers, and residents from across the Treasure  
24 Valley. The committee developed a facility siting criteria

1 to guide them in location of major substations and  
2 transmission lines. Then they proposed transmission line  
3 routes and substation locations to serve the forecasted  
4 build-out electrical load, producing the Treasure Valley  
5 Electric Plan.

6 Q. How does Idaho Power provide electricity to  
7 the city of Kuna (the "City") and to Kuna's area of impact?

8 A. The City is served by distribution circuits  
9 from the Kuna substation located at 135 W. Shortline Street  
10 in Kuna. Kuna's area of impact is predominately served by  
11 distribution circuits from the Mora substation located on  
12 Cloverdale Road north of Deer Flat Road.

13 Q. How does Idaho Power provide electricity to  
14 the two substations that serve the city of Kuna and its  
15 area of impact?

16 A. The Kuna substation is presently served in a  
17 radial fashion, meaning it is served by a single  
18 transmission line. With a single transmission source,  
19 service is subject to transmission line outages. The  
20 radial transmission line serving the Kuna substation is  
21 from the Bowmont - Mora 138 kV transmission line as shown  
22 in Attachment A to the Application. In 1975, this line was  
23 built with 230 kV insulation and Idaho Power plans to  
24 operate the line at 230 kV with the addition of the

1 Hemingway substation. The Mora substation is served by 138  
2 kV transmission connections to Boise Bench, Bowmont, and  
3 Cloverdale.

4 Q. Has the Kuna area experienced electrical  
5 load growth?

6 A. Yes, the Kuna area experienced an 8 percent  
7 annual electrical load growth rate prior to the economic  
8 recession. Idaho Power has planned for a 1.9 percent annual  
9 service area growth rate for many years. A detailed  
10 analysis completed in August 2009 has resulted in an  
11 adjustment down to 1.7 percent annually. However, localized  
12 areas within the service area experience growth rates which  
13 greatly exceed the service territory-wide rate.

14 Q. Does Idaho Power have plans for future  
15 electrical facilities in the Kuna area of impact?

16 A. Yes, there are several projects planned for  
17 the area. Idaho Power constantly reviews and updates its  
18 short term (5 year) and long term (20 year) projected loads  
19 for its service territory and then develops plans and  
20 alternatives to reliably supply that forecasted load. The  
21 projected loads for the Kuna area of impact are beyond our  
22 present facilities' capabilities. The plans developed to  
23 serve this load have led to several projects, both for  
24 capacity increases and improved reliability. The first

1 being the addition of new substations along with the  
2 associated distribution circuits to service future area  
3 load growth. There are also additional transmission  
4 projects related to these future substations as well as the  
5 integration of the power delivered at the Hemingway  
6 substation into the Treasure Valley. These additional  
7 transmission lines will also provide improved electric  
8 service reliability to the Kuna area of impact.

9 Q. How will the Kuna City 09-03-ZOA - Overlay  
10 District Ordinance Amendment impact Idaho Power's ability  
11 to provide reliable service in general and in Kuna  
12 specifically?

13 A. The proposed Overlay District Amendment  
14 prohibits construction of new poles or taller poles and  
15 substation equipment within the area covered by the  
16 Overlay. As a result it will have significant impacts on  
17 both our ability to provide reliable service to Kuna and  
18 the surrounding area. It will also have a major impact on  
19 our ability to operate our 230 kV system reliably in the  
20 entire Southwest Idaho/eastern Oregon service area. With  
21 respect to service specifically to the Kuna area, there are  
22 four projects planned for construction in the near term  
23 (within the next five years) that I will address first.

24 Three of the projects are related directly to

1 serving the present and future electrical loads caused by  
2 the development in the Kuna area of impact. A new  
3 substation, named Columbia, is planned for property north  
4 of the corner of Columbia Road and Kuna-Meridian Road  
5 (State Highway 69). Idaho Power has purchased the land for  
6 this substation and on October 13, 2005, received an Ada  
7 County conditional use permit for the site. This substation  
8 is located within the Overlay District and within 660 feet  
9 of the State Highway 69 centerline where new poles are  
10 prohibited and existing structures are restricted to their  
11 present height.

12 In addition to the new Columbia substation  
13 structures themselves, new distribution and transmission  
14 facilities will be required to provide service from - and  
15 to integrate this substation.

16 Q: What distribution circuits are planned for  
17 the Columbia substation?

18 A. The Columbia substation will ultimately  
19 include eight distribution circuits which will leave the  
20 substation along the major roads. In general, the most cost  
21 efficient distribution design is to place substations at  
22 the center of their service area load. Idaho Power  
23 followed this efficient design in locating the Columbia  
24 substation, so that the planned layout of Columbia's

1 feeders has two feeders in each of the four directions from  
2 the substation. Idaho Power's substation and distribution  
3 circuit design makes use of double circuit distribution  
4 construction for the first mile out of a substation along  
5 each major road to minimize the overall number of poles  
6 required for economic and aesthetic reasons. This design  
7 will require utility poles where none exist today and  
8 require taller poles to replace the existing facilities -  
9 all of which is prohibited by the Overlay District  
10 Amendment.

11 Q: What is the transmission service plan for  
12 the Columbia substation?

13 A. The transmission service plan for the  
14 Columbia substation includes reconstructing the Caldwell-  
15 Mora 230 kV line with double-circuit towers from the  
16 Mora/Hubbard substations to the new Columbia Road/State  
17 Highway 69 substation. This line reconstruction would  
18 require higher towers within the Overlay District.

19 Finally, Idaho Power plans to build a 138 kV  
20 transmission line from the new Columbia substation to the  
21 existing Kuna substation along State Highway 69. As this  
22 new line runs along State Highway 69 most of its distance,  
23 nearly the entire line is within the Overlay District.

24 These three projects are shown in Attachments A and B to

1 the Application.

2 Q: Are there other near term plans or  
3 facilities affected by the Overlay District ordinance?

4 A. Yes. The forth planned near term project is  
5 related to integration of the new Hemingway substation to  
6 the Treasure Valley 230 kV transmission system. Let me  
7 begin with the initial integration of the Hemingway  
8 substation.

9 Idaho Power will connect the Hemingway substation to  
10 the Midpoint - Summer Lake 500 kV line in 2010. A  
11 transformer will be installed at Hemingway to transform the  
12 electricity from 500 to 230 kV. A 230 kV line will be  
13 constructed from Hemingway to the Bowmont substation with a  
14 230 to 138 kV transformer to be installed at Bowmont. This  
15 configuration will suffice until either the Boardman to  
16 Hemingway 500 kV line or the Gateway West project is  
17 constructed. Additional 230 kV transmission capacity will  
18 be required at that time.

19 There are two transmission lines planned from  
20 Bowmont. One will use the existing Mora-Bowmont line and  
21 the other will run on a new right-of-way north to the Happy  
22 Valley substation. The Kuna Overlay District will impact  
23 the line to Mora as Idaho Power's planning studies indicate  
24 that the line conductor will overload with the addition of.

1 the Boardman to Hemingway 500 kV line. This development has  
2 driven a plan to reconstruct of the Bowmont - Mora line  
3 with a larger conductor. Our reconstruction plan is to  
4 build a double-circuit tower configuration from Bowmont to  
5 Mora with one circuit operated at 230 and the other at 138  
6 kV. This line right-of-way crosses the Kuna Mora Road  
7 Overlay District. Idaho Power cannot construct the new line  
8 without placing taller towers within the Overlay District.

9 Q. If the proposed Overlay District Amendment  
10 is implemented, what would be the impact of moving the  
11 Columbia substation location?

12 A. Based on the Overlay District Amendment,  
13 Idaho Power would not be able to build on the property  
14 purchased for be Columbia substation. The Overlay District  
15 Amendment would not allow typical 138 kV transmission to  
16 cross Highway 69 and forces Idaho Power to build the  
17 substation about one mile east of Highway 69. This  
18 substation location results in two additional miles of  
19 double circuit and a mile of single circuit distribution  
20 compared to the Columbia substation property at an  
21 additional cost of approximately \$500,000. Additional  
22 expense would be incurred to bury the distribution circuits  
23 within the overlay district at and additional cost of

1 approximately \$350,000 per mile.

2 The Overlay District Amendment precludes the  
3 placement of new or taller utility poles within the overlay  
4 district which eliminates construction of transmission to  
5 and between the Kuna area substations. Therefore, both the  
6 Kuna and Columbia substations would be configured with  
7 radial transmission service as opposed to the present plan  
8 of network transmission service.

9 Q. What is radial service and what impact might  
10 it have on customers?

11 A. Idaho Power provides three levels of  
12 transmission service to substations: network, improved  
13 radial, and radial. Network transmission service provides  
14 more than one transmission line to a substation. As  
15 described previously, the Mora substation has network  
16 transmission service. It results in a capability of serving  
17 the peak load during an outage of one circuit. The  
18 improved radial service is comprised of two transmission  
19 lines. However, it differs from network service as an  
20 outage of one line may result in load shedding to maintain  
21 service to as many customers as possible.

22 Radial service supplies a substation with a single  
23 transmission line. Presently, the Kuna substation is

1 supplied in this fashion. All customers will be without  
2 power when an outage of the line occurs. The radial service  
3 is the least reliable as it will result in more frequent,  
4 long-duration outages for the customers.

5 Q. Is this Overlay District Amendment  
6 consistent with the transmission line siting criteria  
7 developed by the Treasure Valley Community Advisory  
8 Committee?

9 A. The proposed Overlay District Amendment is  
10 in conflict with the transmission line siting criteria  
11 developed by the Treasure Valley Community Advisory  
12 Committee (CAC). The following is from page 25 of the  
13 Treasure Valley Electric Plan Report:

- 14 1. What are important issues to consider when  
15 locating transmission lines in the Treasure Valley?  
16 • Build transmission lines along or through  
17 undeveloped corridors or undevelopable ground  
18 where possible.  
19 • Secure corridors early—sooner rather than  
20 later. Use a 10-year, at minimum, planning  
21 horizon.  
22 • **Locate transmission corridors with**  
23 **transportation corridors. Use established freeway**  
24 **and highway corridors. (emphasis added)**  
25 • Utilize public lands where possible for 500 kV  
26 lines.  
27 • Consider the value of properties adjacent to  
28 transmission corridors.  
29 • Make sure the proposed or approved corridors  
30 are included on planning maps or future land  
31 acquisition maps. Work towards clarity on local  
32 comprehensive committees and plans.



1 Magic Valley CAC - "Utilize existing electrical and  
2 transportation corridors where feasible when siting  
3 new electrical transmission facilities"  
4 Eastern Idaho CAC - "Use major/existing corridors and  
5 identified right of ways (i.e. transportation, BLM,  
6 USFS) where feasible; be flexible and consider  
7 potential impacts"  
8

9 Q. Are the facilities identified in this case  
10 to be built in the City of Kuna's area of impact, and  
11 within the designated Overlay District, required in order  
12 to continue to provide service to Kuna?

13 A. The Company must construct facilities in the  
14 Kuna area to meet its continuing obligation to serve  
15 customers and to provide reliable service. Thus, the  
16 Company is requesting an Order from the Commission  
17 affirming that the public convenience and necessity  
18 requires the same. The proposed facilities are required in  
19 order to provide adequate and reliable service to the City,  
20 and to the surrounding areas of western Ada County.  
21 Alternatives to the proposed facilities are more costly,  
22 and will be less reliable not only for Kuna, but also for  
23 the larger transmission system. If the Company is not  
24 allowed to erect new utility poles and expand existing  
25 structures in the Overlay District, the City will be  
26 severely limited in the service that it can receive. The  
27 new Columbia substation would have to be located elsewhere,

Angell, DI

1 outside of the Overlay District, and both it and the  
2 existing Kuna substation will be limited to a less reliable  
3 radial transmission service. Future large load industrial  
4 and commercial customers could not be served with the  
5 existing infrastructure, and would require their own  
6 special facilities to be constructed on a case-by-case  
7 basis if located in the City's area of impact.

8 Q. Could Kuna's Overlay District ordinance  
9 impact Idaho Power's other customers?

10 A. Yes. If Idaho Power is prohibited from  
11 constructing any new poles or upgrading any existing poles  
12 in the Overlay District it will result in increased cost,  
13 and decreased reliability not only for the immediate  
14 facilities and service to the Kuna area discussed above,  
15 but also on a longer term and wider ranged transmission  
16 system basis when transmission from the Hemmingway station  
17 must be integrated and constructed.

18 Q. Does this conclude your direct testimony in  
19 this case?

20 A. Yes, it does.